Session 115

Open Source at Apple

Brett Halle
Director, Core OS Engineering

Introduction

- Overview of Apple's open source projects
  - Darwin (OS)
  - HeaderDoc
  - CDSA
  - Streaming Server
  - OpenPlay
  - Documentation
- Where we're going
- How you can participate

Apple Public Source License

- Version 1.2 released
- Approved by Open Source Initiative

Common Data Security Architecture

- Open Group standard
- Basis for security features in Mac OS X
  - Keychain, …
- Modular plug-ins for:
  - Cryptography
  - Certificate management and trust
  - Storage of keys
- Now available:
  http://www.opensource.apple.com/

Open Source Developer Benefits

- Learn and use Mac OS X with live source code
  - Get great code examples from the repository
  - Add instrumentation to Apple software
  - Track down problems while developing
- Resolve issues with help from other developers
  - Using mailing lists, sharing code examples
- Deliver high-quality software products

Open Source Apple Benefits

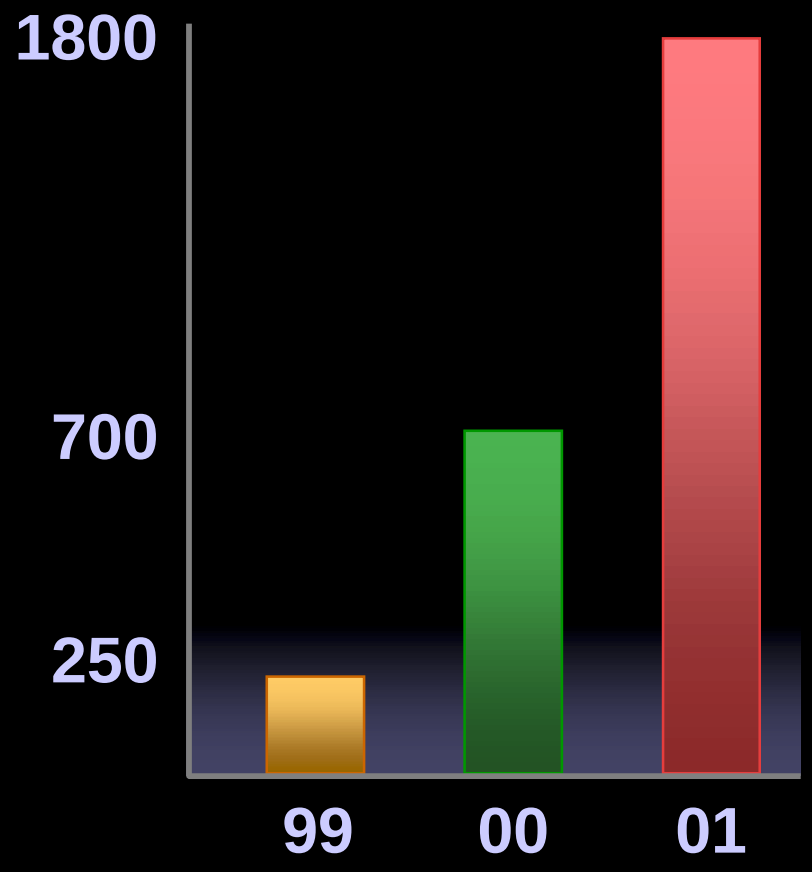
- More hands on deck
  - Bug fixes, features, performance, compatibility
- Lots of projects are being ported to Mac OS X
- More closely synchronize with latest versions
- Makes our products better

Community/Customer Benefits

- Upstream commits of software enhancements
- Increased installed base of open source users
- Adapt software to specific environments
- Online community available for informal support
- Higher quality products via open source process

Growing Community

- Over 700,000 Darwin downloads since 1.0
- Over 95,000 user registrations
- Over 1,800 mail list messages per month



Contributions To and From the Community

- FreeBSD, Apache, X11, MySQL, PAM, PHP, . . .
- Darwin support for x86 platform
- Streaming Server ported to 6 platforms
- Cross-platform NetSprocket/OpenPlay
- Open Source mods → Apple SW Update releases
- Calls to Apple Support line with patches!
- . . .And lots more!

“Darwin Developers”

- Development partners for open source projects
  - Can help you with questions
  - Can incorporate your mods into CVS
- Selected experienced developers
  - Recognized technical ability
  - Approved by Apple Executive management

Darwin Developers

Rob Braun:	Kernel
Louis Gerbarg:	Commands
Joe Gervais:	NetSprocket / OpenPlay
Luke Howard:	NetInfo
Jordan Hubbard:	FreeBSD
Torrey T. Lyons:	XFree86 window server
Lane Roathe:	NetSprocket / OpenPlay
Fred Sanchez:	BSD
Andrew Stone:	CoreFoundation
Adrian Sun:	Streaming Server
Chuck Swiger:	Installation
Scott Vail:	IOKit
Justin Walker:	Networking
Assar Westerlund:	Arla

Summary

- Open Source benefits:
  - Developers, Apple, Community, Customers
- Growth of Apple's open source efforts
- Darwin Developer program

Up Next

- Support Resources . . . . . Dave Zarzycki
- Darwin. . . . . .Dave Zarzycki
- Streaming Server. . . . . Chris LeCroy
- NetSprocket/OpenPlay. . . . Lane Roathe
- HeaderDoc. . . . . Ron Hayden
- Q&A

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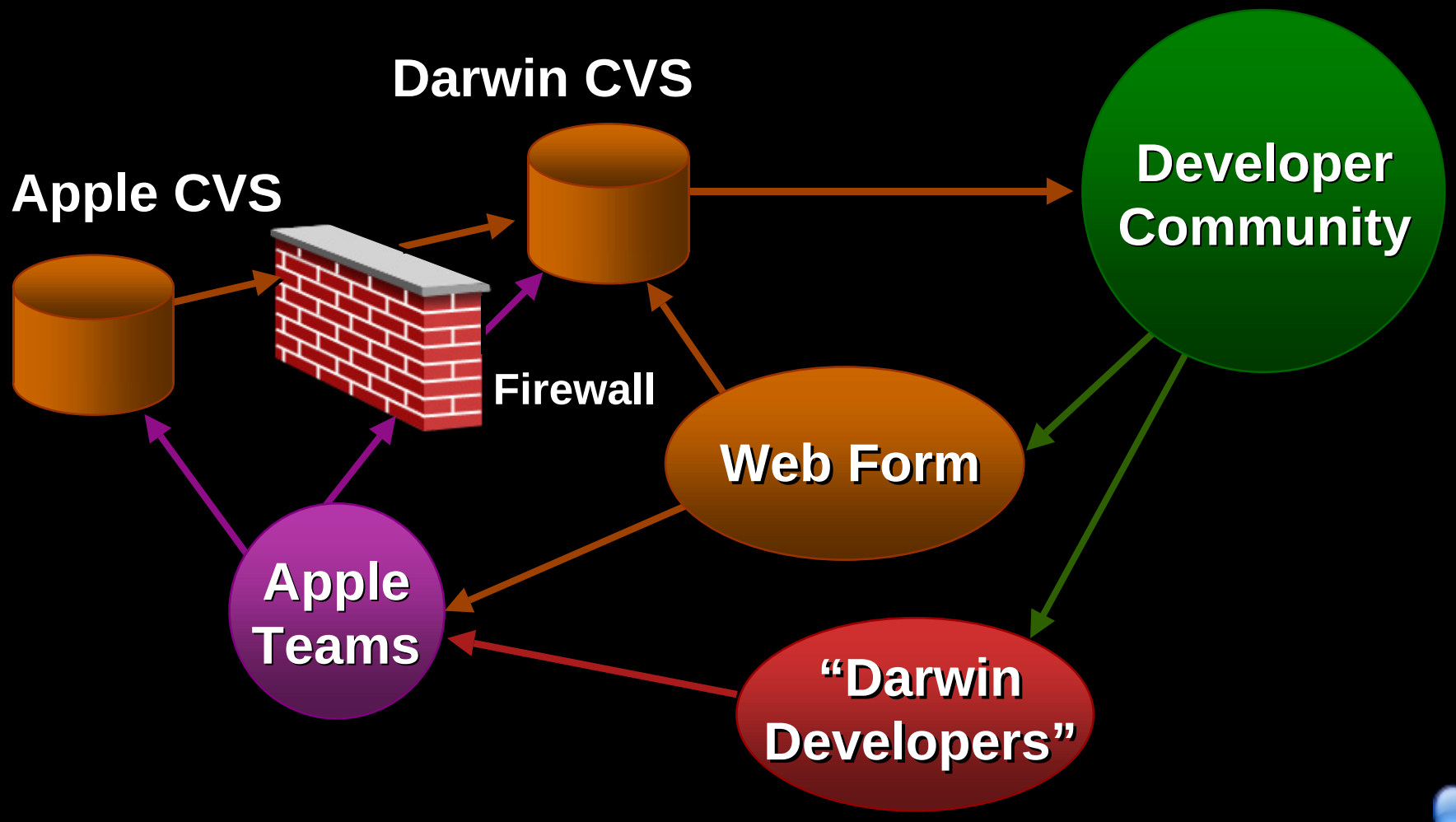
Open Source at Apple Support Resources

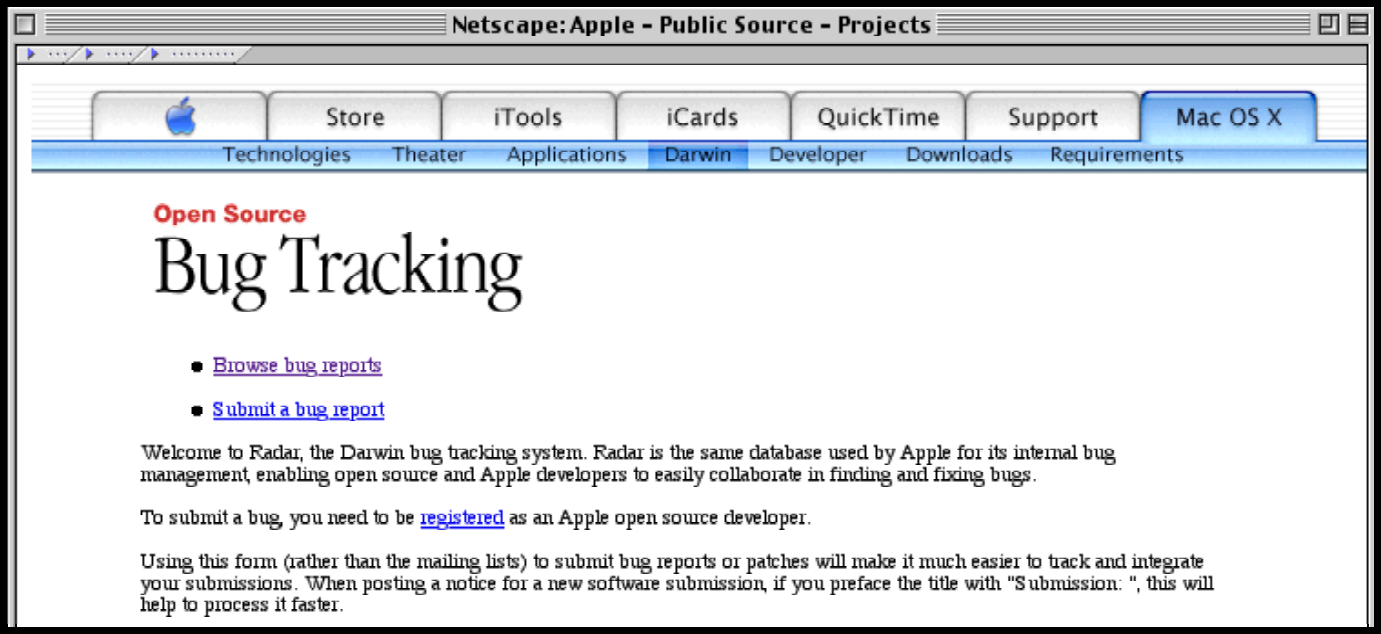
Dave Zarzycki
Engineer/Scientist, Core OS

CVS


Darwin CVS
Apple CVS
Developer Community
Firewall
Web Form
Apple Teams
“Darwin Developers”

Bug Tracking

- Browse and submit bugs via web site
- Uses Apple's internal bug tracking system (Radar)
- Updated 3 times daily



Summary

- Website:
  http://www.opensource.apple.com/
- CVS:
  http://www.opensource.apple.com/tools/cvs/
- Mailing lists:
  http://lists.apple.com/
- Bug tracking:
  http://www.opensource.apple.com/projects/bugs.html
- Darwin Developers:
  http://www.opensource.apple.com/developer/

Hexley

- **http://www.hexley.com/**
- Created by Jon Hooper for use by the Darwin community

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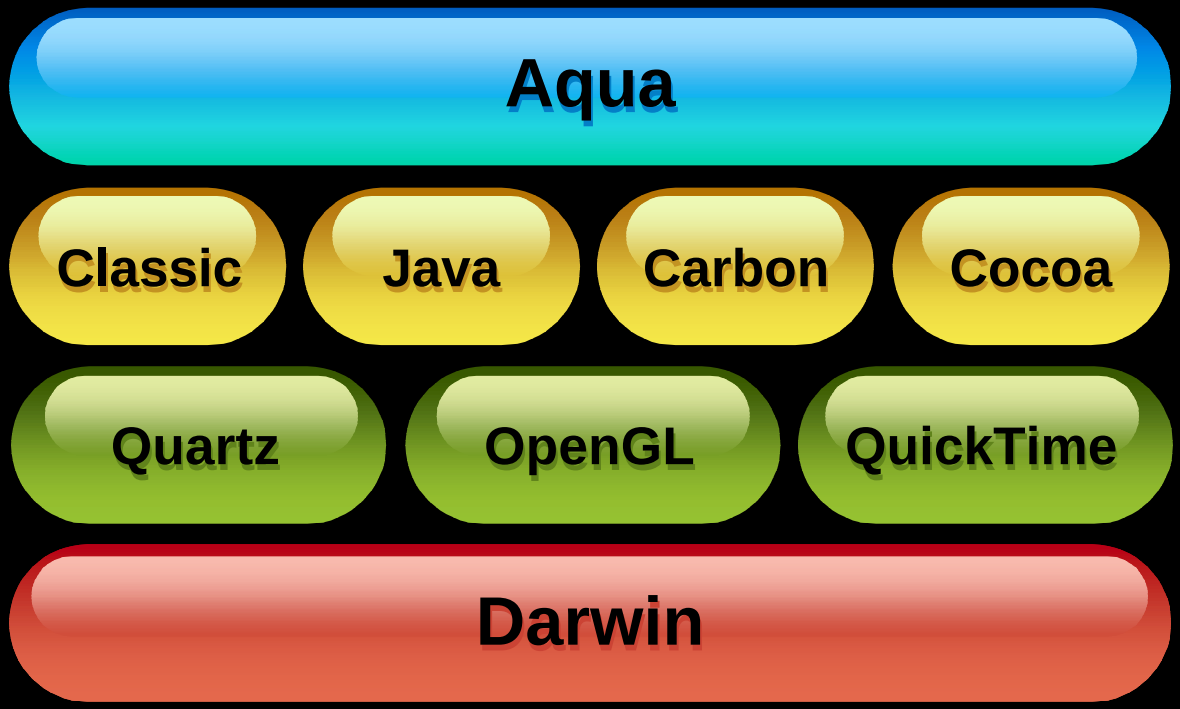
Open Source at Apple Darwin

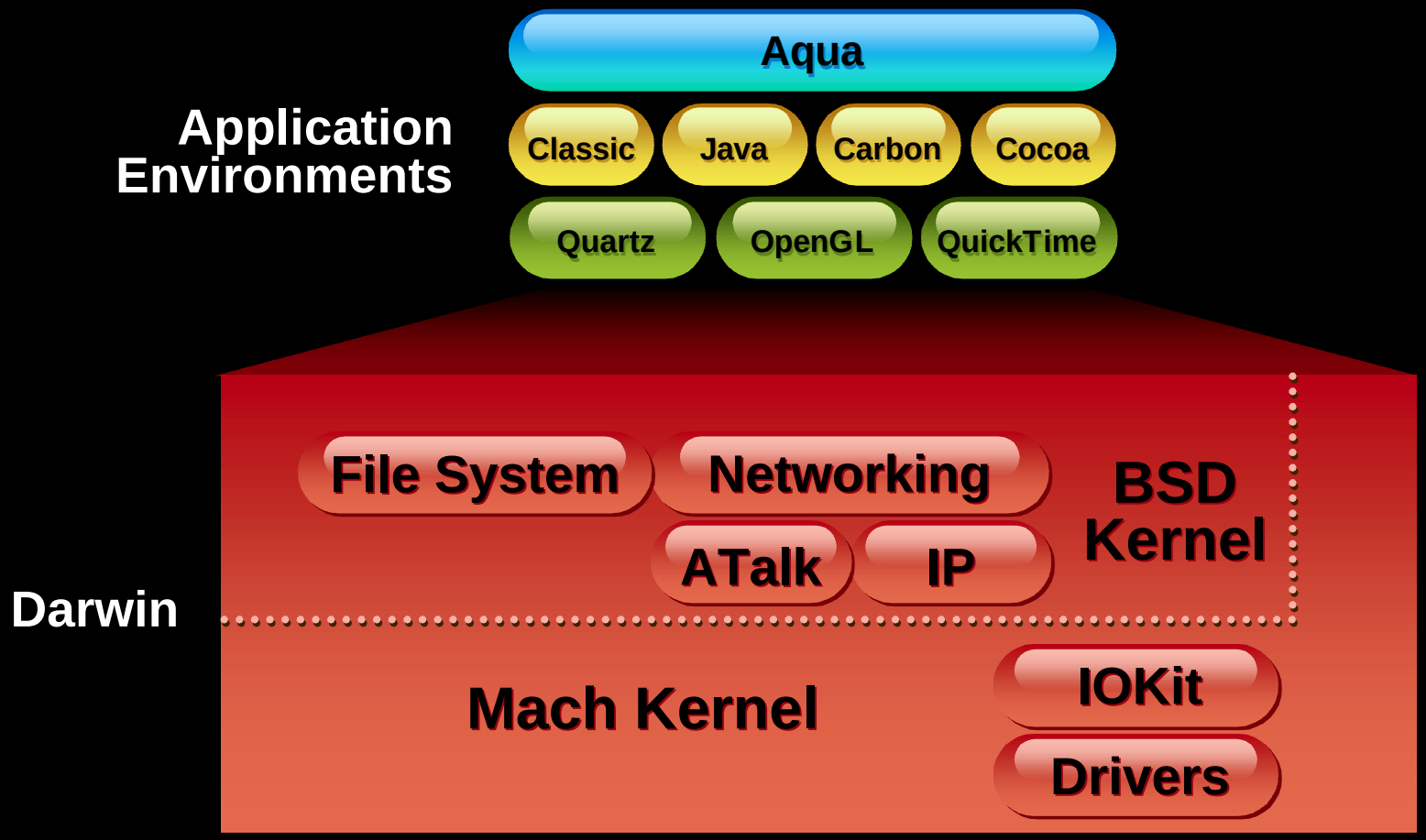
Dave Zarzycki
Engineer/Scientist, Core OS

Darwin

- Darwin = Mac OS X Core OS
- Can swap a Darwin kernel into a Mac OS X system



Darwin Overview



Darwin Overview

- Foundation of Mac OS X
- BSD-based with Mach kernel and IOKit
- Extensible to support a variety of file systems
- Dynamic and flexible configuration management
- PowerPC and x86 platform support
  - Downloadable binaries from web site

Demo

Wilfredo Sanchez
Darwin Developer

Roadmap

139 Leveraging BSD Services in Mac OS X	Civic **Fri., 2:00pm**
140 The Darwin Kernel	Civic **Fri., 3:30pm**
FF121 Feedback Forum: Darwin	Civic **Fri., 5:00pm**

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Open Source at Apple Streaming Server

Chris LeCroy
Engineering Manager, QuickTime Streaming Server

What's in a Name?

- "QuickTime Streaming Server" is a brand name
- Streaming Server (open source) = QTSS code
- They're 100% identical

Platforms

Mac OS X	RedHat Linux	FreeBSD	Solaris	NT / 2000

Mac OS	SGI	Compaq Tru64™	Other Linuxes	. . .

Newest Features

- Web-based administration
- Broadcast automation
- “Skip Protection”
- Digest/MD5 authentication
- A few minor API changes

People Like It!

- Over 50,000 downloads of Streaming Server
- Over 150 million copies of QuickTime client in distribution
- Over 500 developers currently subscribed to Streaming Server developer mailing list

Who Uses It?

- Lots of different places, including:
  - NASA
  - PopWire
  - Vancouver Film School
  - SURFnet-TV
  - Inktomi
  - Compaq
  - Mt. Erebus Volcano Observatory

Online Resources

- Streaming-server-developers mailing list
  - **http://lists.apple.com/**
- Apple Open Source
  - **http://www.opensource.apple.com/**
- QuickTime
  - **http://developer.apple.com/quicktime/**

Roadmap

403 Broadcating Live with QuickTime Streaming	Room A2 **Wed., 5:00pm**
406 QuickTime & Darwin Streaming Server Overview	Civic **Thurs., 9:00am**
407 Customizing QuickTime & Darwin Streaming Server	Civic **Thurs., 10:30am**
FF109 Feedback Forum: QuickTime	Room J1 **Thurs., 3:30pm**

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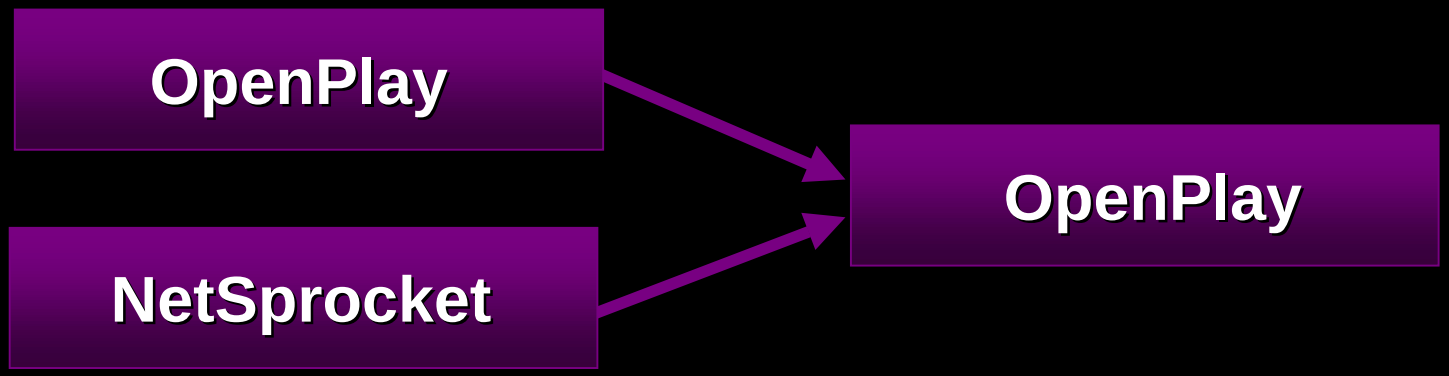
Open Source at Apple
OpenPlay

Lane Roathe
CEO, Monkey Byte Development

NetSprocket → OpenPlay

- Full NetSprocket functionality is now incorporated into OpenPlay

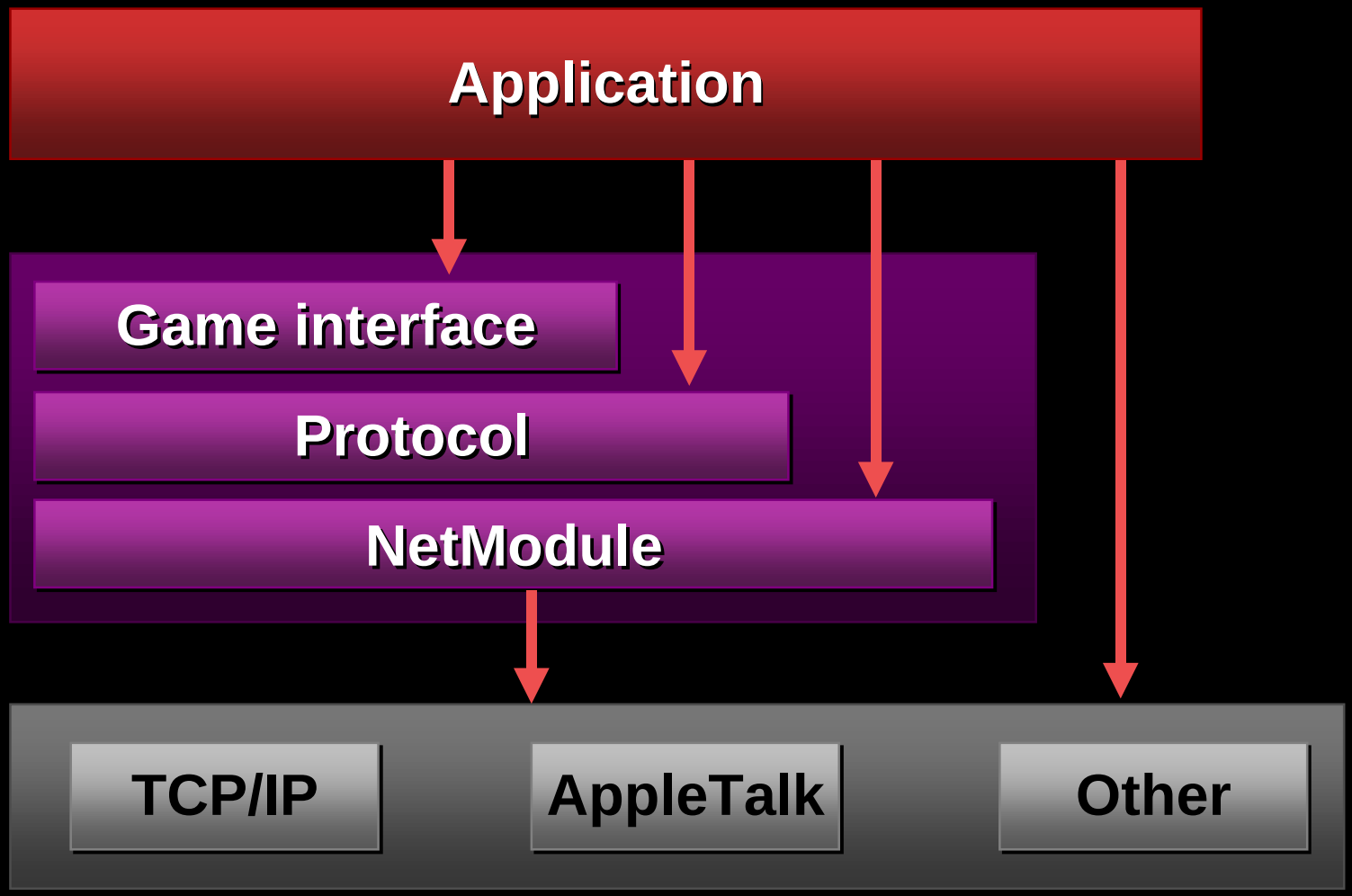


- NetSprocket source remains available
  - But all forward activity will be on OpenPlay

OpenPlay

- Networking API
  - Designed for protocol and OS independence
    - Mac OS X, Mac OS, Windows, …
    - TCP/IP, AppleTalk, …
- 3 API Layers
  - Game interface (OpenPlay)
  - Protocol interface (Protocol)
  - Networking interface (NetModule)

OpenPlay


Application
Game interface
Protocol
NetModule
TCP/IP
AppleTalk
Other

Game Interface

- Easy way to add networking to games / apps
- Contains the high-level NetSprocket APIs
- Player management
- Packet management
- Cross platform
  - Mac OS X, Mac OS, Windows, . . .

Protocol Interface

- Low-level network API for real-time applications
- Protocol agnostic plug-in design
  - IP for all platforms
  - Mac OS platform also contains AppleTalk
- Cross-platform
  - Mac OS X, Mac OS, Windows, . . .
  - Linux support underway by the community

Networking Interface

- Low-level API used by the Protocol layer
- Plug-in design
  - Allows modules to be added independently
- Single API to handle diverse network APIs
  - TCP/IP, AppleTalk, …

Roadmap

FF120 Feedback Forum: Games Technologies

Room J1
Fri., 5:00pm

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Open Source at Apple
Darwin Doc Project

Ron Hayden
Apple Technical Publications

Darwin Doc Project Overview

- HeaderDoc
- HOWTO documents
- man pages
- Doc generation tools

HeaderDoc

- Integrates documentation with source code
  - For C and C++
- Provides user-friendly HTML documentation

Class:
IOEventSource

Introduction

Member Functions

Public

disable
enable
getAction
getWorkLoop
isEnabled
onThread
setAction

Protected

checkForWork
getNext
init
setNext
setWorkLoop

Member Data

checkForWork

Abstract: Pure Virtual member function used by IOWorkLoop for work scheduling.

```
protected:
virtual void checkForWork(bool *moreP, mach_timesp
```

This function will be called to request a subclass to check it's internal state for any work to do and then to call out the owner/action.

Parameters

Name	Description
moreP	Pointer to the more-work output variable. Set to true if this function needs to be called again before all its outstanding events have been processed.
wakeupTimeP	Pointer to no-later wake up time output variable. Return variable to indicate when this object wishes to be called again; used for timeouts. Note the checkForWork method may be called before the timeout fires. Defaults to MACH_TIMESPEC_ZERO which is interpreted as no timeout requested.

Help Build Great Documentation

- See **http://www.opensource.apple.com**
  - Doc Tools, How-To, . . .
- Contribute your own documentation
- Let us know what documentation is needed
  - Darwin Doc Project session on Friday

Roadmap

137 Mac OS X Documentation How To	Room C **Fri., 9:00am**
707 Darwin Documentation Project & Header Doc	Room A2 **Fri., 10:30am**

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Wrapping Up

Wrapping Up

- Apple is committed to open source
- Join the community of open source developers
  - Over 3,500 on our open source mail lists
- Upcoming conferences with Darwin
  - MacHack: June 21–23 Michigan
  - USENIX: June 25–30 Boston
  - O'Reilly Open Source: July 23–27 San Diego

Q&A

Jason Yeo
Mac OS X Technology Manager
jason@apple.com

http://developer.apple.com/events/urls.html

WWDC

Worldwide Developers Conference 2001